What Is Claimed Is:

1. A capillary structure for a heat transfer device comprising:

a plurality of particles comprising a first species of particle and a second species of particle, said plurality of particles being joined together by a brazing compound such that fillets of said brazing compound are formed between adjacent ones of said plurality of particles so as to form a network of capillary passageways between said particles; wherein said first species of particle and said second species of particle are each disposed within said capillary structure in homogenous layers.

2. A capillary structure for a heat transfer device according to claim 1 comprising a plurality of homogeneous layers.

3. A capillary structure for a heat transfer device according to claim 1 comprising at least three homogeneous layers.

4. A capillary structure for a heat transfer device according to claim 1 comprising at least three species of particle.

5. A capillary structure for a heat transfer device according to claim 4 comprising at least three homogenous layers.

6. A capillary structure according to claim 1 wherein said plurality of particles comprise a first melting temperature and said brazing compound comprises a second melting temperature that is lower than said first melting temperature.

7. A capillary structure according to claim 1 wherein said brazing compound comprises about sixty-five percent weight copper and thirty-five percent weight gold particles such that said fillets of said brazing compound are formed between adjacent ones of said plurality of particles so as to create a network of capillary passageways between said particles.

8. A capillary structure according to claim 1 wherein said fillets are formed by capillary action of said braze compound when in a molten state.

9. A capillary structure according to claim 1 wherein said metal particles are selected from the group consisting of carbon, tungsten, copper, aluminum, magnesium, nickel, gold, silver, aluminum oxide, and beryllium oxide.

10. A capillary structure according to claim 1 wherein said metal particles comprise a shape selected from the group consisting of spherical, oblate spheroid, prolate spheroid, ellipsoid, polygonal, and filament.

11. A capillary structure according to claim 1 wherein said metal particles comprise at least one of copper spheres and oblate copper spheroids having a melting point of about one thousand eighty-three °C.

12. A capillary structure according to claim 6 wherein said brazing compound comprises six percent by weight of a finely divided copper/gold brazing compound.

13. A capillary structure according to claim 6 wherein said brazing compound is present in the range from about two percent to about ten percent.

14. A capillary structure according to claim 6 wherein said metal particles comprise copper powder comprising particles sized in a range from about twenty mesh to about two-hundred mesh.

15. A capillary structure according to claim 6 wherein said braze compound particles comprise about minus three hundred and twenty-five mesh.

16. A capillary structure according to claim 1 wherein said metal particles that are a constituent portion of said braze compound comprise a smaller size than said metal particles.

17. A capillary structure according to claim 1 wherein said braze compound is selected from the group consisting of nickel-based Nicrobrazes, silver/copper brazes, tin/silver, lead/tin, and polymers.

18. A capillary structure according to claim 1 wherein said plurality of metal particles comprise aluminum and magnesium and said brazing compound comprises an aluminum/magnesium intermetallic alloy.

19. A wick for a heat pipe comprising:

a plurality of particles comprising a first diameter and a second diameter, said plurality of particles being joined together so as to form a network of capillary passageways between said particles; wherein said first diameter particles are disposed within a first substantially homogenous layer and said second diameter particles are disposed within a second substantially homogenous layer.

20. A wick according to claim 19 comprising a plurality of homogenous layers.

21. A heat pipe comprising:

a sealed enclosure having an interior surface;

a working fluid disposed within said enclosure; and

a wicking structure disposed upon said interior surface and comprising a plurality of particles including a first species of particle and a second species of particle, said plurality of particles being joined together so as to form a network of capillary passageways between said particles; wherein said first species of particle and said second species of particle are each disposed within said wicking structure in substantially homogenous layers.

22. A capillary structure for a heat transfer device comprising:

a plurality of particles comprising a first species of particle having a first size and a second species of particle having a second size, said plurality of particles being joined together by a brazing compound such that fillets of said brazing compound are formed between adjacent ones of said plurality of particles so as to form a network of capillary passageways between said particles; wherein said first species of particle and said second species of particle are each disposed within said capillary structure in substantially homogenous layers, wherein a plurality of vapor vents are defined through said capillary structure.

23. A capillary structure according to claim 22 wherein said vapor vents comprise a cross-sectional profile selected from the group consisting of cylindrical, conical, frustoconical, triangular, pyramidal, rectangular, rhomboidal, pentagonal, hexagonal, octagonal, polygonal and curved.

24. A capillary structure for a heat transfer device comprising:

a plurality of particles comprising a first species of particle having a first average particle diameter and a second species of particle having a second average particle diameter wherein said plurality of particles are joined together so as to form a network of capillary passageways between said particles, and further wherein said first species of particle and said second species of particle are each disposed within said capillary structure in substantially homogeneous layers; and

a plurality of blind bores are defined through said capillary structure such that each blind bore has a closed end comprising a particle layer that comprises at least one dimension that is no more than about six average particle diameters of at least one of said first species and said second species of particle.

25. A capillary structure for a heat transfer device comprising:

a plurality of particles comprising a first species of particle having a first diameter, and a second species of particle having a second diameter wherein said plurality of particles are joined together in substantially homogenous layers so as to form a network of capillary passageways between said particles, wherein a plurality of blind bores are defined through said homogenous layers of particles such that each blind bore has a closed end comprising a vent-wick layer that comprises at least one dimension that is no more than about six average particle diameters of at least one of said first species and said second species of particle.

26. A heat pipe comprising:

a hermetically sealed and partially evacuated enclosure, said enclosure comprising internal surfaces;

a wick disposed on at least one of said internal surfaces and comprising a plurality of particles comprising a first species of particle having a first size and a second species of particle having a second size, said plurality of particles being joined together so as to form a network of capillary passageways between said particles; wherein said first species of particle and said second species of particle are each disposed within said wick in substantially homogenous layers; and

a two-phase fluid at least partially disposed within a portion of said wick.

27. A heat pipe according to claim 26 comprising graded substantially homogeneous layers.

28. A heat pipe according to claim 26 comprising transversely graded substantially homogeneous layers.

29. A heat pipe comprising:

a hermetically sealed and partially evacuated enclosure, said enclosure comprising internal surfaces;

a wick disposed on at least one of said internal surfaces and comprising a plurality of particles comprising a first species of particle having a first diameter and a second species of particle having a second diameter, said plurality of particles being joined together so as to form a network of capillary passageways between said particles; wherein said first species of particle and said second species of particle are each disposed within said wick in substantially homogenous layers and further wherein a plurality of blind bores are defined through said capillary structure such that each blind bore has a closed end comprising a vent-wick layer that comprises at least one dimension that is no more than about six average particle diameters of at least one of said first species and said second species of particle; and

a two-phase fluid at least partially disposed within a portion of said wick.

30. A heat pipe according to claim 29 wherein said vent-wick layer at the closed end of each of said blind bores comprises said first species of particle.

31. A heat pipe according to claim 29 wherein said vent-wick layer at the closed end of each of said blind bores comprises said second species of particle.

32. A heat pipe according to claim 29 comprising a plurality of homogeneous layers formed by those portions of said first species of particles and

said second species of particles disposed around said vent-wick layer at said closed end of each of said plurality of blind-bores.

33. A heat pipe according to claim 29 comprising at least three homogeneous layers formed by those portions of said first species of particles and said second species of particles disposed around said vent-wick layer at said closed end of each of said plurality of blind-bores.

34. A heat pipe comprising:

a hermetically sealed and partially evacuated enclosure, said enclosure comprising internal surfaces;

a wick disposed on at least one of said internal surfaces and comprising a plurality of particles comprising a first species of particle having a first size and a second species of particle having a second size, said plurality of particles being joined together so as to form a network of capillary passageways between said particles; wherein said first species of particle and said second species of particle are each disposed within said wick in graded homogenous layers, and further wherein at least one vapor vent is defined through said wick; and

a two-phase fluid at least partially disposed within a portion of said wick.

35. A heat pipe comprising a sealed and partially evacuated tubular enclosure having an internal surface covered by a brazed wick comprising a plurality of copper particles comprising a first species of particle having a first diameter and a second species of particle having a second diameter, and joined together by a brazing compound comprising about sixty-five percent weight copper and thirty-five percent weight gold such that fillets of said brazing compound are formed between adjacent ones of said plurality of particles so as to form a network of capillary passageways between said particles wherein said first species of particle and said second species of particle are each disposed within said wick in substantially homogenous layers; and

a working fluid disposed within said tubular enclosure.

36. A heat pipe according to claim 35 wherein said metal particles are selected from the group consisting of carbon, tungsten, copper, aluminum, magnesium, nickel, gold, silver, aluminum oxide, and beryllium oxide.

37. A heat pipe according to claim 36 wherein said metal particles comprise a shape selected from the group consisting of spherical, oblate spheroid, prolate spheroid, polygonal, and filament.

38. A heat pipe comprising a sealed and partially evacuated tubular enclosure having an internal surface covered by a brazed wick comprising a

plurality of copper particles comprising a first species of particle having a first diameter and a second species of particle having a second diameter, and joined together by a brazing compound comprising about sixty-five percent weight copper and thirty-five percent weight gold such that fillets of said brazing compound are formed between adjacent ones of said plurality of particles so as to form a network of capillary passageways between said particles wherein said first species of particle and said second species of particle are each disposed within said wick in a plurality of substantially homogenous layers, and including a plurality of vapor vents defined through said wick; and

a working fluid disposed within said tubular enclosure.

39. A heat pipe comprising:

a sealed and partially evacuated enclosure having an internal surface;

a wick disposed upon said internal surface comprising a plurality of sintered particles comprising a first species of particle, a second species of particle, and a third species of particle, wherein said first species of particle, said second species of particle, and said third species of particle are each disposed within said wick in substantially homogenous layers; and

a working fluid disposed within said enclosure.

40. A heat pipe comprising:

a sealed and partially evacuated enclosure having an internal surface;

a wick disposed upon said internal surface comprising a plurality of sintered particles comprising a first species of particle, a second species of particle, and a third species of particle, wherein said first species of particle, said second species of particle, and said third species of particle are each disposed within said wick in substantially homogenous layers, and further including at least one vapor vent that is defined through a portion of said wick; and

a working fluid disposed within said enclosure.

41. A heat pipe comprising:

a sealed and partially evacuated tubular enclosure being sealed at a first end and having an internal surface covered by a brazed wick comprising a plurality of particles comprising a first species of particle and a second species of particle, said first species and said second species of particle being joined together by a brazing compound such that fillets of said brazing compound are formed between adjacent ones of said particles so as to form a network of capillary passageways between said particles;

a base sealingly fixed to a second end of said enclosure so as to form an internal surface within said enclosure wherein said wick is formed on said base including said first species of particles and said second species of particles each disposed within said wick in substantially homogenous layers;

a working fluid disposed within said enclosure; and

at least one fin projecting radially outwardly from an outer surface of said tubular enclosure.

42. A heat pipe comprising:

a sealed and partially evacuated tubular enclosure being sealed at a first end and having an internal surface covered by a brazed wick comprising a plurality of particles comprising a first species of particle and a second species of particle, said first species and said second species of particle being joined together so as to form a network of capillary passageways between said particles;

a base sealingly fixed to a second end of said enclosure so as to form an internal surface within said enclosure wherein said wick is formed on said base including said first species of particles and said second species of particles each disposed within said wick in substantially homogenous layers, and further including at least one vapor vent that is defined through a portion of said wick;

a working fluid disposed within said enclosure; and

at least one fin projecting radially outwardly from an outer surface of said tubular enclosure.